RD-120TE/RD-130TE

DAT DATA RECORDER

INSTRUCTION MANUAL

MP MASTER

MA28805

TEAC

P/No. 10111417-00B

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1. OVERVIEW

The development of personal computers in recent years has promoted the automation of measurement processing. This trend has improved the functions and accuracy of various types of data recorders.

The RD-120TE/RD-130TE is a high-density multiplex PCM data recorder using a helical scanning rotary head, which was developed as a small measuring device. The RD-120TE/RD-130TE data recorder has achieved superior functions in the number of data channels, recording frequency band, phase characteristics, signal-to-noise ratio, and recording time compared to existing data recorders. Since the RD-120TE/RD-130TE can automatically record memo sound, time codes, counter values, and data numbers (ID numbers) with the dedicated channels (which are independent of the data channels) and has a high-speed search function with the data number (ID number), measurement accuracy is increased.

Despite its compactness, the RD-120TE/RD-130TE uses a power supply operating from ac input, a power supply operating from dc input, and an optional rechargeable battery, which means the RD-120TE/RD-130TE can be used indoors and outdoors, such as in the field or in a laboratory.

The easy-to-use recording media are stored in a cassette conforming to the DAT conference standards. The recording method also conforms to the DAT standards.

2. FEATURES

1) High-quality data (accuracy)

A desired input range can be selected among four ranges. An ADC using the delta sigma method is used for each channel. The 64-fold over-sampling digital filter provides the satisfactory anti-aliasing characteristics. An octuple over-sampling DAC is used for output. Using filters designed to suit the purpose provides the following high-quality data. The signal-to-noise ratio is 72 dB. The frequency characteristic flatness is +0.5 dB, -1dB. The phase difference between channels is 3° (max).

2) Multi-channels and wide band

There are two models: The RD-120TE and the RD-130TE. The RD-120TE uses a 2-channel/4-channel switching system. The band for 2-channel recording is 20 kHz and the band for 4-channel recording is 10 kHz . The RD-130TE uses a 2-channel/4-channel/8-channel switching system. The band for 2-channel recording is 20 kHz. The band for 4-channel recording is 10 kHz. The band for 8-channel recording is 5 kHz. The model can be selected depending upon the purpose.

3) Small and compact

The data recorder is approximately 306 mm wide x 100 mm high x 280 mm deep ($12^{1}/_{16}$ x $3^{15}/_{16}$ x $12^{1}/_{16}$ in.), and weighs approximately six kilograms (13.2 lbs). The data recorder is therefore very portable.

4) Long recording time

When a 120 tape (approximately 60 m) is used, data can be recorded continuously for two hours.

5) Three power supplies

The RD-120TE/RD-130TE operates on either ac input of 90 to 264 volts, dc input of 11 to 30 volts, which are provided normally, and an optional rechargeable battery unit. The battery unit can be incorporated by mounting it on the data recorder. The RD-120TE/RD-130TE can be used both indoors and outdoors.

6) Easy operation

The RD-120TE/RD-130TE is designed so that an operation button corresponds to one function as much as possible. These operation buttons facilitate operations for recording on a site.

7) Memo sound channel

In addition to the data channels, a channel used only for voice recording and reproduction is provided. Since the microphone built into the data recorder is provided normally for recording, environmental sounds can always be recorded during measurement.

8) Time code recording channel

In addition to the data channels, a channel used only for recording and reproduction of time codes is built in. The year, month, day, hours, minutes, and seconds of the built-in clock with perpetual calendar are automatically recorded. Since the time code is always automatically recorded, it can be used to confirm the recording time of measurement data on the display.

9) Data number (ID number) recording channel

In addition to the data channels, a channel used only for recording and reproduction of ID numbers is built in. The ID number of the recorded data is automatically recorded. The ID number is incremented by one each time recording starts or the EVENT button is pressed.

10) High-speed search

The recorded ID number can be searched for at high speed during reproduction. The search is performed both in the forward and reverse directions. When the target ID number is found, the target data is reproduced from the beginning.

11) Bar meter monitor

All channels can be monitored at one time with the 6-segment display bar meters. In this case, the memo sound channel can also be monitored. The signal level can be monitored both during recording and reproduction.

12) Speaker monitor

The memo sound and the data of any data channel can be heard from the built-in speaker.

3. NOTES BEFORE POWER-ON

3-1) Appearance and Accessory Check

Take out the data recorder and its accessories from the transportation container and check the model name and its accessories.

RD-120TE (2-channel/4-channel) x 1, accessories
RD-130TE (2-channel/4-channel/8-channel) x 1, accessories

See item 8 in this manual for the list of accessories.

3-2) Setting Environment

When using the RD-120TE/RD-130TE, consider environmental conditions such as temperature, humidity, dust, vibration, barometric pressure, magnetic fields, and atmosphere. Please note the following:

a) When moving the data recorder or tape from a place of low temperature to a place of high temperature, condensation may form around the unit or tape. Wait at least 30 minutes after turning on the power or after checking that there is no dew condensation around the unit and tape before inserting a tape. If a tape with condensation is inserted, the tape may become tangled around the rotary head. Condensation may form if the temperature varies 15°C (59°F) or more per hour irrespective of the humidity being within the specified range.

   Note: If the condensation sensor operates, all tape operation LEDs light and tape operation is disabled.

b) Remove the tape from the data recorder before turning off the power. Turning off the power with a tape inserted may cause the tape to become tangled around the rotary head, if there is any condensation before the power is turned on again.
   If the tape becomes tangled around the rotary head, take the appropriate action in section 6 of this manual.

3-3) Input Terminal

The I/O terminal of the data recorder is unbalanced. When the BNC connector cable supplied as an accessory is connected to the I/O terminal of the unit, the outer side of the connector is connected to the frame of the unit. The input impedance is 100 kΩ, the maximum absolute input voltage is ±100 V, the output impedance is 75 Ω, and the maximum output current is ±10 mA under the load of 20 Ω.
When a signal is input to the output terminal, the output amplifier may be damaged.

3-4) Power Supply

The data recorder operates from ac input of 90 to 264 volts or from dc input of 11 to 30 volts. If a power cable which is not supplied as an accessory is used, use one with a small resistance. Since the power supply unit of the RD-120TE/RD-130TE uses a switching method, excessive current flows from the battery at power-on time. Therefore, use the power suitable for this current.
When using the optional BU-41 battery unit, mount it securely on the data recorder. Use the optional BU-41-CH battery charger for charging the BU-41. When the dc power supply including the BU-41 battery unit is used in the RD-120TE/RD-130TE, automatically operates if the voltage drops below approximately 10.2 V, shutting off the power. In this case, turn the POWER switch off to prevent the battery from discharging.
To use dc power again, charge the battery so that the correct dc power voltage is obtained and turn the POWER switch off. Then turn the switch on.

3-5) Operation

When inserting a tape cassette in the cassette compartment, before closing the compartment, always make sure that the tape cassette is pushed in all way. Also, after ejecting a tape cassette, which may cause the tape cassette to be pushed back a little, before closing the cassette compartment, push in the tape cassette all the way.

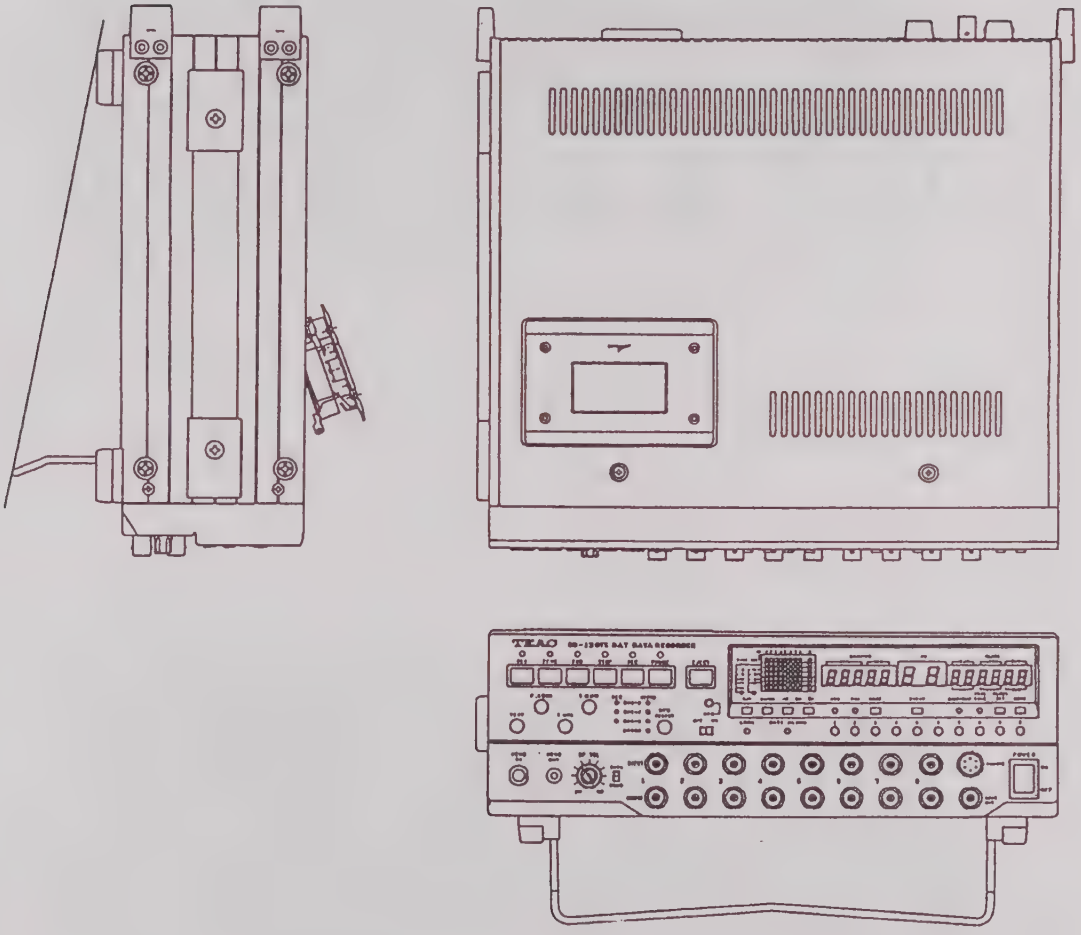
3-6) Mounting Optional Accessories

Mount the optional accessories after checking the data recorder.
Refer to each specification manual for mounting the optional accessories, BU-41 battery unit, and ER-40 remote control unit.

4. APPEARANCE AND FUNCTIONS

4-1) Appearance

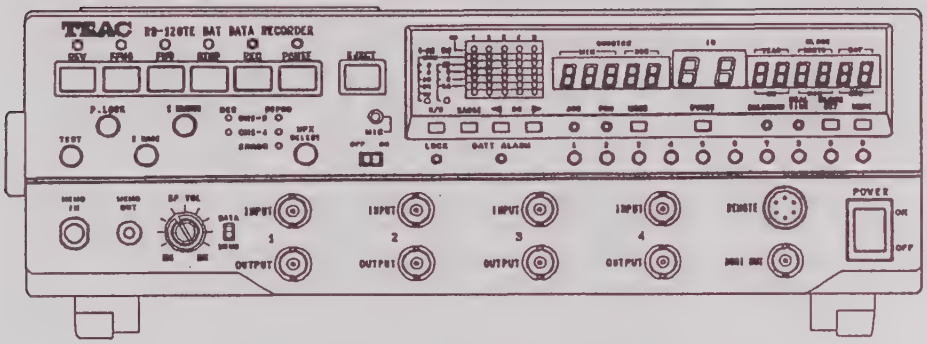
4-1-1) Views from three sides



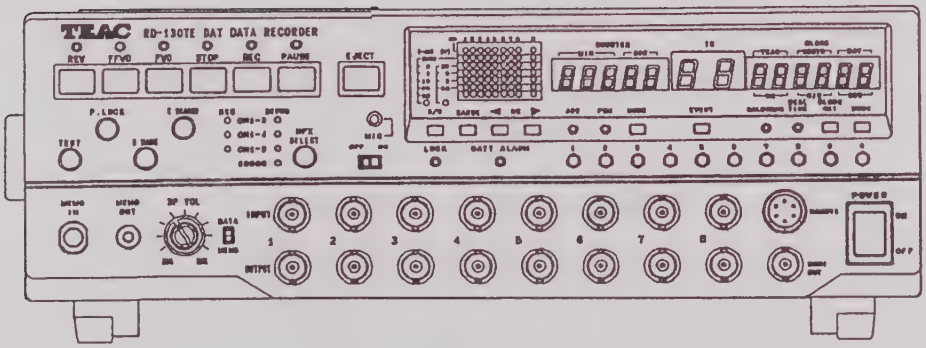
Unit: mm

The figure above is for the RD-130TE.
Only the above front view is different from the front view for the RD-120TE.

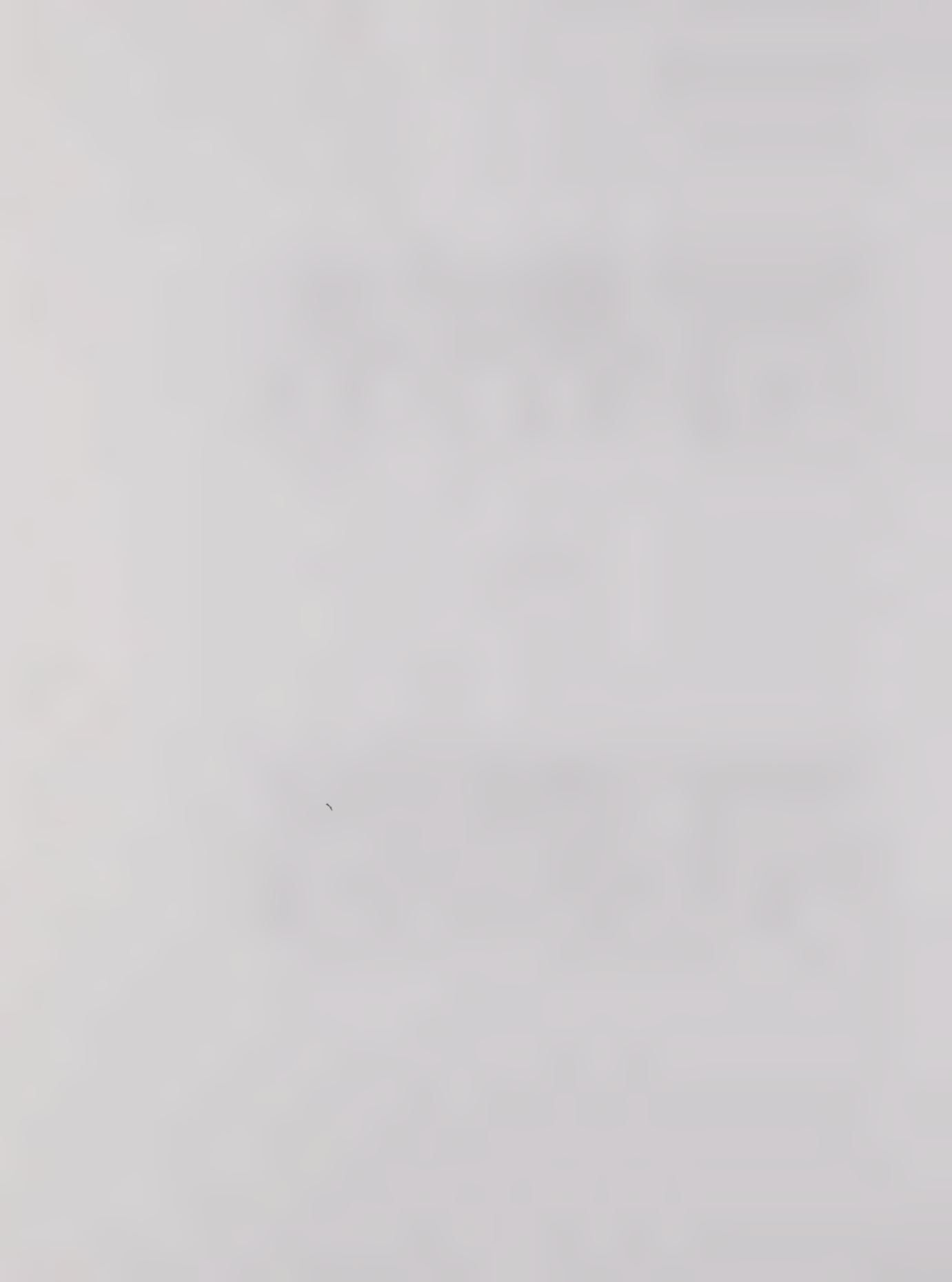
4-1-2) RD-120TE and RD-130TE



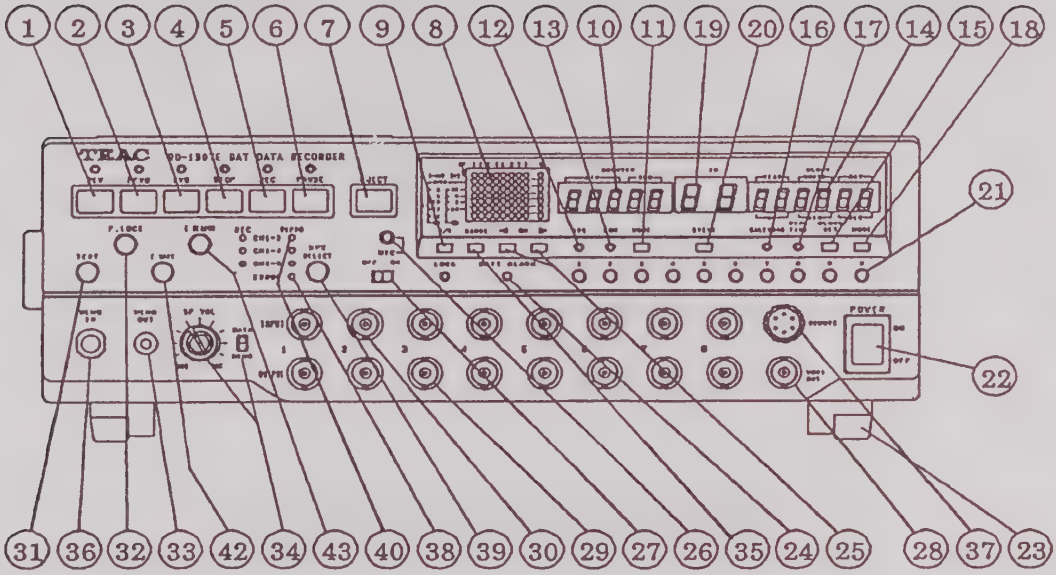
RD-120TE

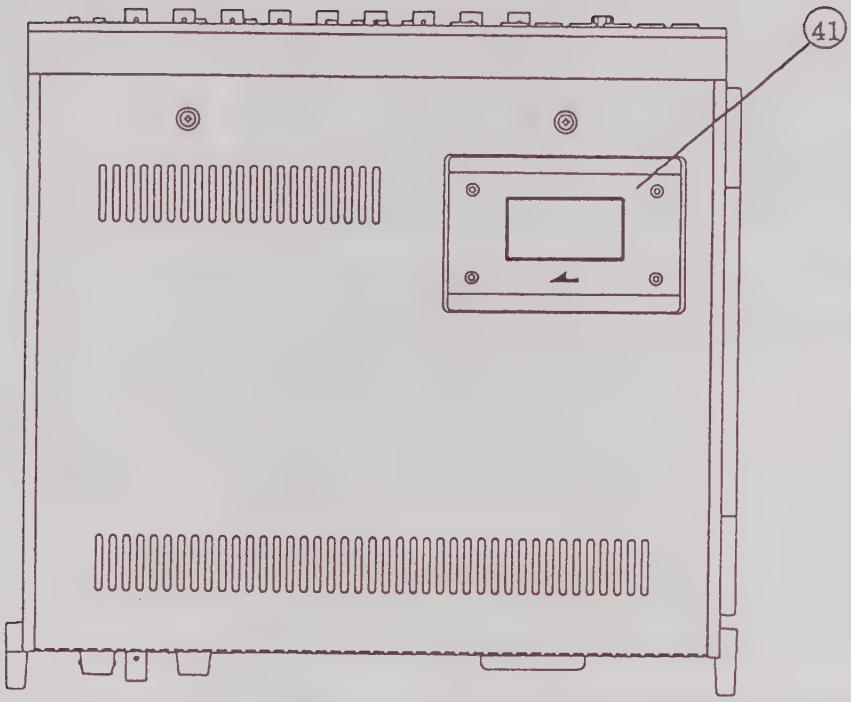


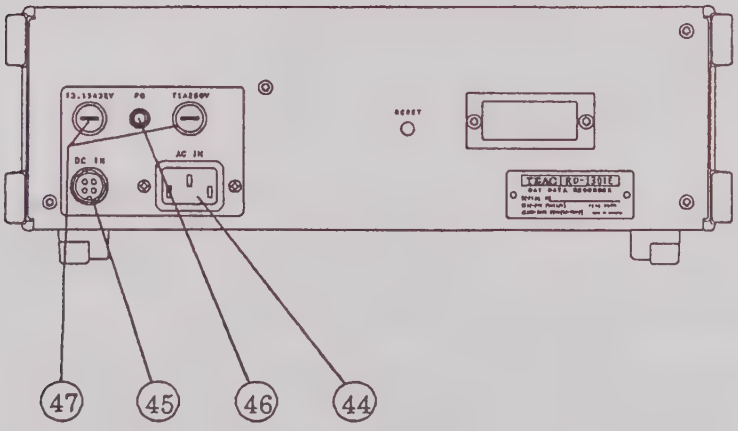
RD-130TE



4-2) Reference Numbers




41

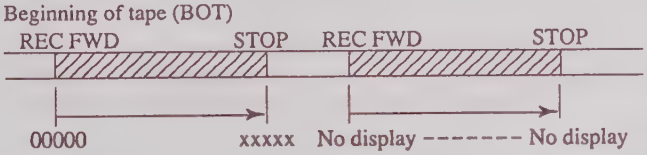

DC IN
AC IN
47
45
46
44

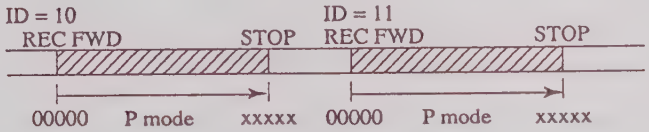
4-3) Names and Functions

Part No.	Name	Function
①	REW (Rewind)	- Pressing the REW button in the stop mode rewinds the tape. - Pressing the REW button once while in the FWD mode rewinds the tape until the beginning of the data with the currently displayed ID number at high speed then automatically reproduces the tape . In the same way, pressing the REW button more than once consecutively rewinds the tape at high speed to the beginning of the data having the ID number less than that of the current data by the number of times the REW button is pressed minus one, then automatically reproduces the tape. (Note) When the ID number is recorded incorrectly, the above operation may not be performed. - When the REW and FWD buttons are pressed at the same time, the data recorder enters the REVIEW (triple-speed tape running) mode. No reproduction signal is output, however.
②	F-FWD (Fast-forward)	- Press the F-FWD button in the stop mode to fast-forward the tape. - Pressing the F-FWD button once while in the FWD mode fast-forwards the tape until the beginning of the data with the ID number next to the currently displayed ID number at high speed then automatically reproduces the tape. In the same way, pressing the F-FWD button more than once consecutively fast-forwards the tape at high speed to the beginning of the data having the ID number greater than that of the current data by the number of times the F-FWD button is pressed then automatically reproduces the tape. (Note) When the ID number is recorded incorrectly, the above operation may not be performed. - When the F-FWD and FWD buttons are pressed at the same time, the data recorder enters the CUE (triple-speed tape running) mode. No reproduction signal is output, however.
③	FWD (Reproduction)	- Pressing the FWD button while in the stop mode runs the tape in the forward direction and reproduces the tape . - Setting the ID number with the ID SEARCH button in the stop mode then pressing the FWD button searches the tape for the set ID number at high speed then automatically reproduces the tape. (Note) When the ID number is recorded incorrectly, the above operation may not be performed.
④	STOP (LOAD STOP) (UNLOAD STOP) (Stop)	- Pressing the STOP button while in any mode stops the tape running or releases the pause mode. - There are two stop modes: LOAD STOP: When the tape is touching the head UNLOAD STOP: When the tape is not touching the head and the tape has reached its end (Note 1) The data recorder enters the UNLOAD STOP mode after approximately five minutes elapse in the LOAD STOP mode. The STOP LED and 7-segment ID LEDs flash. (Note 2) The UNLOAD STOP mode is for protection of the tape and the head.

Part No.	Name	Function
⑤	REC (Recording)	- Pressing the REC button while in the stop mode causes the REC and PAUSE indicators to light and prepares for recording. After this, pressing the FWD button starts data recording. (Note 1) Pressing the REC and FWD buttons at the same time does not start data recording. (Note 2) The REC and PAUSE indicators flash and the data recorder enters the UNLOAD STOP mode after approximately five minutes elapse in the REC PAUSE mode. Pressing the FWD button in this status starts data recording. (Note 3) When the user presses the FWD button with the REC and PAUSE indicators flashing, the data recorder enters the REC mode after a few seconds.
⑥	PAUSE (Pause)	- Pressing the PAUSE button while in the REC or FWD mode pauses recording or reproduction. Pressing the FWD button again resumes recording or reproduction. Pressing the PAUSE button while in the FWD mode causes the PAUSE indicator only to light. - Pressing the PAUSE button while in the stop mode is equivalent to the pausing while in the FWD mode. (Note) The data recorder enters the stop mode after approximately five minutes elapse in the FWD PAUSE mode. It enters the UNLOAD STOP mode after approximately five more minutes elapse.
⑦	EJECT (Ejection)	- Pressing the EJECT button once while in a mode other than the REC and REC PAUSE modes opens the cassette compartment, enabling the tape to be inserted or removed. (Note) Eject operations are valid only when the power is turned on.
⑧	MULTI DISPLAY (Bar graph/input range display)	- The input ranges or bar meters selected by the B/R button are displayed. - In the top row, the monitor channel or the channel for which the input range is to be switched is displayed. - When the bar meters are selected, the I/O levels of all channels and memo announcement are displayed. In the REC PAUSE or REC FWD mode, the input levels are displayed. In the FWD mode, the reproduction levels are displayed. - When the input ranges are selected, the input ranges of all channels are displayed with dots.
⑨	B/R (BAR/RANGE)	- This is an alternate switch. This switch selects the input ranges or bar meters for MULTI DISPLAY. When the input ranges are selected, the RANGE LED lights. Pressing the RANGE button switches the input range of the channel selected with the CH SEL button. When the bar meters are selected, the BAR LED lights. The bar meters are displayed in MULTI DISPLAY so that the user can monitor the input status.
⑩	COUNTER (Minutes/seconds display)	- Displays the minutes and seconds which are recorded on the tape. Alternatively, displays the minutes and seconds which have been recorded on the tape. - The maximum display is 199 minutes and 59 seconds. (Note) If a tape is used which has no counter value recorded in each mode, nothing may be displayed.
⑪	MODE SW (A-P mode switching)	- Switches the counter display between the ABS (Absolute) and PGM (Program) modes.

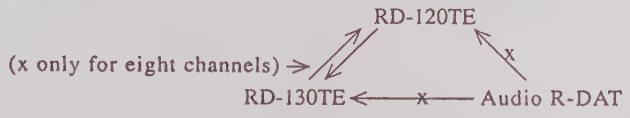
<table>
<tr><th>Part No.</th><th>Name</th><th>Function</th></tr>
<tr><td>⑫</td><td>ABS (Absolute) LED
(Absolute time)</td><td>- When the LED lights, the absolute time from the beginning of the tape (BOT) is displayed on the counter.
(Note) The value displayed on the A counter disappears after a gap between data when data is recorded discontinuously on a tape or the data is reproduced.

 
</td></tr>
<tr><td>⑬</td><td>PGM (Program) LED
(Program time)</td><td>- When the LED lights, the time from the beginning of data (BOT) for each ID number is displayed on the counter.

 
</td></tr>
<tr><td>⑭</td><td>CLOCK
(Clock/calendar display)</td><td>- Displays the time (hours, minutes, and seconds) or the calendar (year, month, and day).
<table>
<tr><td rowspan="2">FWD</td><td>Recorded tape</td><td>Displays the reproduction time on the tape.</td></tr>
<tr><td>Unrecorded tape</td><td>Nothing may be displayed.</td></tr>
<tr><td>F-FWD
REW
STOP
PAUSE</td><td></td><td>Previous state</td></tr>
<tr><td colspan="2">REC PAUSE
REC FWD
During power-on</td><td>Displays the time in real time.</td></tr>
</table>
(Note) When the MPX ERR indicator lights or a tape which was recorded incorrectly is reproduced, a hit-or-miss display may occur or nothing may be displayed. This is not an error, however.</td></tr>
<tr><td>⑮</td><td>CLOCK SET</td><td>- When the user presses the CLOCK button three or more seconds, the 7-segment LED of the least significant digit in the CALENDAR (year, month, and day) or REAL TIME (hours, minutes, and seconds) mode starts flashing. Enter the year, month, and day or hours, minutes, and seconds with the number buttons from 0 to 9.
- Press the CLOCK button after entering the desired numbers with the number buttons. Then the time setting is complete.</td></tr>
<tr><td>⑯</td><td>CALENDAR LED</td><td>- While the LED is on, the year, month, and day are displayed on the CLOCK.</td></tr>
</table>

<table>
<tr><th>Part No.</th><th>Name</th><th>Function</th></tr>
<tr><td>⑰</td><td>REAL TIME LED
(Clock real time indicator)</td><td>- While the LED is on, hours, minutes, and seconds are displayed on the CLOCK.</td></tr>
<tr><td>⑱</td><td>MODE SW
(CALENDAR-REAL TIME mode selector switch)</td><td>- Used to switch the CLOCK display between the CALENDAR (calendar) and REAL TIME (clock) modes.</td></tr>
<tr><td>⑲</td><td>ID
(Data number display)</td><td>- Displays the data number.
- Displays the following in addition to the data number
<table><tr><th>ID display</th><th>Status</th></tr><tr><td>00 flashing</td><td>Tape being loaded or unloaded</td></tr><tr><td>AA</td><td>Unrecorded tape</td></tr><tr><td>BB</td><td>On the lead-in tape for five seconds from BOT</td></tr><tr><td>No display</td><td>No tape</td></tr><tr><td>EE</td><td>On the E MARK</td></tr></table>- When the data recorder enters the REC PAUSE or REC FWD mode from the beginning of the tape, the tape automatically runs with ID number BB displayed for approximately five seconds. The data recorder then pauses recording in the REC PAUSE mode or records ID numbers starting at 01 in the REC FWD mode.
- When recording ID numbers on an unrecorded tape, numbering automatically starts at 01. An arbitrary number cannot be set.
- In each REC FWD mode, the ID number is incremented by one before it is recorded.
- For nine seconds after the ID number changes, the decimal point of each digit in the display flashes.</td></tr>
<tr><td>⑳</td><td>EVENT SW</td><td>- Pressing the EVENT switch button while in the REC FWD mode increments the ID number by one.
- It takes about nine seconds to record an ID number. While recording the ID number, the EVENT switch button is disabled.</td></tr>
<tr><td>㉑</td><td>Number buttons</td><td>- Used to search a tape on which ID numbers are recorded for an ID or set the calendar clock.</td></tr>
<tr><td>㉒</td><td>POWER
(Power ON/OFF switch)</td><td>- This is a rocker switch. Pressing the upper side of this switch turns on the power. Pressing the lower side of this switch turns off the power.</td></tr>
<tr><td>㉓</td><td>Rubber foot with stand</td><td>- Pulling out the stand enables the front of the data recorder to incline about 10°.</td></tr>
<tr><td>㉔</td><td>BATT ALM
(Voltage alarm indicator)</td><td>- Flashes when the voltage is 11 V or less when the dc power or optional battery unit is used.</td></tr>
<tr><td>㉕</td><td>CH SEL</td><td>- Selects the monitor channel. Specifies a channel for which the input range is to be set with RANGE. The LED corresponding to the specified channel at the top of MULTI DISPLAY lights.</td></tr>
</table>

<table>
<tr><th>Part No.</th><th>Name</th><th>Function</th></tr>
<tr><td>㉖</td><td>Microphone hole</td><td>- Hole for the built-in microphone</td></tr>
<tr><td>㉗</td><td>Microphone SW</td><td>- When this switch is on with no external microphone connected, the microphone built in the main unit is on.
- When this switch is on with an external microphone connected, the built-in microphone is off and the external microphone is on regardless of whether the press talk SW on the external microphone is on.
- When this switch is off, the built-in microphone is off. The external microphone operates depending on whether the press talk SW is on.
(Note) When an external microphone is connected to the optional ER-40 remote control unit, the setting of the microphone SW on the main unit is ignored.</td></tr>
<tr><td>㉘</td><td>MONI OUT
(Monitor output)</td><td>- The output of the channel selected by the channel selector switch is as follows:
<table><tr><th>Mode</th><th>MONI OUT</th></tr><tr><td>STOP</td><td>0 V</td></tr><tr><td>FWD</td><td>Tape output</td></tr><tr><td>REC FWD
REC PAUSE</td><td>E-E (A/D → D/A) output</td></tr><tr><td>F-FWD
REW</td><td>0 V</td></tr></table></td></tr>
<tr><td>㉙</td><td>OUTPUT
(Output connector)</td><td>- Output connector
- A voltage of 2 Vp is output for 100% input.</td></tr>
<tr><td>㉚</td><td>INPUT
(Input connector)</td><td>- Input connector
- The input voltage range is ±0.5 V, ±2 V, ±5 V, or ±20 V (maximum).</td></tr>
<tr><td>㉛</td><td>TEST
(Test signal generator)</td><td>- Generates a test signal of about 50% at 1 kHz.
- A test signal is output while the TEST button is held down in the REC PAUSE or REC FWD mode.
- Can be used for checking the E-E (A/D → D/A) function during recording or for a simplified check of the record/reproduction function during reproduction.</td></tr>
<tr><td>㉜</td><td>P.LOCK</td><td>- When the LOCK indicator flashes, then lights by pressing the P-LOCK switch three or more seconds, all switches are locked.
- When the LOCK indicator flashes, then goes off by pressing the P-LOCK switch three or more seconds, the switches are unlocked.</td></tr>
<tr><td>㉝</td><td>MEMO OUT
(Earphone output)</td><td>- Used to hear the memo sound or data sound from the earphone.
- When the earphone is plugged into the MEMO OUT jack, the sound from the speaker is disconnected.</td></tr>
<tr><td>㉞</td><td>SP VOL
DATA/MEMO</td><td>- Volume control of the speaker and the earphone.
- The DATA/MEMO SW switches the memo sound to the data sound or vice versa.</td></tr>
<tr><td>㉟</td><td>RANGE</td><td>- Pressing this button selects ±0.5/2/5/20 Vp for the input level of the channel set with CH SEL. This operation is enabled only when RANGE is selected with the B/R button.</td></tr>
</table>

Part No.	Name	Function
㊱	MEMO IN	- Used when the memo sound is input with the microphone supplied as an accessory. - When the microphone jack is plugged into the MEMO IN connector, the built-in microphone is automatically disconnected and memo sound can be input via the external microphone only.
㊲	REMOTE	- For use with the optional ER-40 remote control unit. - The switches on the data recorder are operable even during use of the ER-40. - The switches on the data recorder are valid when both the switches on the data recorder and the ER-40 are pressed at the same time.
㊳	MPX REP ERROR (Data reproduction error)	- Lights when a data error occurs in the REC FWD or FWD mode resulting from a damaged tape, recording malfunction, reproduction malfunction, or clogged head. - Lights when a tape which was recorded by the tape recorder of a different model is reproduced. (Lights for a case marked with x in the figure below)  (Note) This indicator lights when an unrecorded tape is reproduced. The status of this indicator remains unchanged until the next reproduction.
㊴	MPX SELECT CH1-2 CH1-4 CH1-8 (RD-130TE)	- Switches the number of channels used for recording. The LEDs for recording light as follows. This switch is disabled during recording. When this switch is set to CH1-2, signals can be input to or output from the first and second channels. When the switch is set to CH1-4, signals can be input to or output from the first through fourth channels. When the switch is set to CH1-8, signals can be input to or output from the first through eighth channels.
㊵	MPX REPRO CH1-2 CH1-4 CH1-8 (RD-130TE)	- MPX display during reproduction - If two channels are selected during recording, the CH1-2 indicator automatically lights in the FWD mode. If four channels are selected during recording, the CH1-4 indicator automatically lights in the FWD mode. If eight channels are selected during recording, the CH1-8 indicator automatically lights. (Note) When tape containing no record is reproduced, all indicators light. Even when reproduction is completed, these lights remain on until the next reproduction start.
㊶	CASSETTE COMPARTMENT	- Pocket for inserting and removing the tape - Pressing the EJECT button when the power is supplied opens the cassette compartment, enabling the tape to be inserted or removed. - Push the cassette compartment securely enough to close and lock it.
㊷	E MARK	- Pressing this button three or more seconds in the REC PAUSE mode writes an E mark. (Note 1) For details, see Section 5-10, "End Search" on page 24. (Note 2) No recording can be performed on any E mark. (Note 3) No E mark can be written following an unrecorded portion or in a range within nine seconds from an ID change.

Part No.	Name	Function
㊸	E SEARCH (End search)	- Pressing this button performs REW, searches a tape for the end of recording or a recorded E mark from BOT at a high speed, and stops tape running. - Pressing this button three seconds in the STOP mode performs the above operation.
㊹	ac power input connector	- Connected to the cable during the use of ac power .
㊺	dc power input connector	- Connected to the cable during the use of dc power . - Also connected to the connector of the optional BU-41 battery unit.
㊻	FG (Grounding terminals)	- Grounding terminal
㊼	Fuse holder	- On each holder, a fuse for ac or dc power is mounted.

5. OPERATION METHOD

5-1) Basic Operation

Perform the following operations and checks according to the steps below:

Step	Precautions and display of this unit
1) Connect the power cable.	Be sure to check whether the input power conforms to the power range marked on this unit.
2) Turn the POWER switch on.	Display of this unit COUNTER Off ID Off CLOCK Year, month, day or hour, minute and second display MODE CALENDAR or REAL TIME If the BATT ALM lights increase the dc power-supply voltage.
3) Press the EJECT button.	The cassette compartment is opened. ID 00 flashes or is off.
4) Insert a cassette tape.	Insert a cassette tape so that the direction of its arrow matches that of the arrow on the cover of the cassette compartment. (Use a new cassette tape starting at the beginning of the tape.) Always push the tape cassette into the cassette compartment all the way.
5) Press down the cassette compartment.	Press the cassette compartment until it locks.
6) Automatic tape loading	After the tape is loaded automatically, it touches the head and runs a little. COUNTER Off ID 00 CLOCK Calendar or time display
7) Press the REC button.	The REC and PAUSE indicators light. (Preparation for recording is complete.) ID BB REC, PAUSE } These indicators flash for about five seconds.
8) Press the FWD button.	Recording starts the moment the REC and FWD indicators light. COUNTER Recording elapsed time display (common to both ABS and PGM modes) ID 01 CLOCK Calendar or time display
Approx. 60 seconds (Press the TEST button.)	When the TEST button is pressed, this unit records 1 kHz and approx. 50% test signal. Bar meter: The last three dots are turned on for each channel. For channel M (memo) ambient sound level is indicated. Generation of the test signal stops when the TEST button is released.

Step	Precautions and display of this unit
9) Press the PAUSE button.	The tape stops running temporarily the moment the REC and PAUSE indicators light. COUNTER Stops. ID 01 CLOCK Calendar or time display
10) Press the FWD button. Approx. 60 seconds	Recording restarts the moment the REC and FWD indicators light. COUNTER ABS Displays continuously. PGM Elapsed recording time beginning with 000 ID 02 CLOCK Calendar or time display
11) Press the PAUSE button. Repeats recording operation (approx. 60 seconds for each operation) in steps 8) and 9) until the ID number reaches 10.	Conforms to step 9). ID 02 → 03 → 09 → 10
12) Press the STOP button.	The tape stops running. COUNTER Stops. ID 10 CLOCK Calendar or time display
13) Press the REW button.	The unit rewinds the tape to the beginning and stops automatically. Operation during tape rewind: COUNTER Displays the counter value recorded in the tape. ID Displays the ID value recorded in the tape. CLOCK Calendar or time display When the tape is stopped: COUNTER Off ID 00 CLOCK Calendar or time display

Step	Precautions and display of this unit
14) Press the FWD button.	This unit reproduces the contents recorded from the beginning of the tape. COUNTER ABS: Continuous minute and second display from 000 (beginning of tape) PGM: Minute and second display from 000 whenever recording starts ID Displays 01 to 10. CLOCK CALENDAR: Displays the recorded year, month, and date. REAL TIME: Displays the recorded hour, minute, and second. Bar meter Each channel: Displays the value of the recorded signal M (memo) channel: Displays the level of the recorded ambient sound. SP VOL: DATA/MEMO selector switch enables the sound recorded in the memo channel or data sound of the channel selected by CH SEL to be heard MONI OUT Outputs data of the data channel selected by CH SEL. MEMO OUT The data can be listened to using the earphone, in which case the speaker is disconnected.

5-2) Connection of the Input Signal

Connect the attached I/O cable to the INPUT connector and connect signals corresponding to channels of each cable.
On the RD-120TE, input can be made via CHl and CH2 or CHl through CH4. The MPX SELECT CH1-2/CH1-4 switch is used to change the channel group. The recording frequency is dc to 20 kHz (each channel) for CHl and CH2 and dc to 10 kHz (each channel) for CHl through CH4. On the RD-130TE, input can be made via CH1 and CH2, CH1 through CH4, or CH1 through CH8. The recording frequency is dc to 20 kHz (each channel) for CH1 and CH2, dc to 10 kHz (each channel) for CH1 through CH4, or dc to 5 kHz (each channel) for CH1 through CH8.
Select input range 0.5 V, 2 V, 5 V, or 20 V according to the voltage of the input signal. The maximum input voltage is ±0.5 V, ±2 V, ±5 V, or ±20 V. Care must be taken as input exceeding the range causes saturation during reproduction. (Select the correct input range so that the top indicator of the bar meter does not light.)

5-3) Connection of the Output Signal

Recorded data is output to the OUTPUT connector. Connect the attached I/O cable between this unit and another unit. An output current of ±10 mA can be used for each channel. The output voltage is fixed to ±2 Vp.

5-4) Memo (Announcement) Recording or Reproduction

This unit is equipped with a built-in microphone, so that it always records its ambient sound automatically when the user presses the REC and FWD buttons with the MIC ON/OFF switch on. The microphone provides the AGC control facility so that recording can be made at an appropriate level. The bar meter at mark M shows the input level of the microphone.
When recording sound using an external microphone, plug the external microphone into the MEMO IN connector. The microphone picks up sound when the user presses the press talk switch. When the MIC ON/OFF switch is on, the microphone picks up sound regardless of the status of the press talk switch. The built-in microphone is disconnected automatically when an external microphone is used. When there is no memo to be recorded, the attached MIC ON/OFF switch must be turned off.
The speaker is used to reproduce the sound. When the user plugs the earphone into the MEMO OUT connector, the speaker is disconnected.

5-5) Data Sound Monitoring

The user can listen to the input sound or the output sound reproduced from the tape in this unit. When the DATA/MEMO switch is set to DATA, the current mode is changed to the data monitoring mode. Then, select a channel with the CH SEL switch.
Monitoring the input sound is permitted during REC PAUSE or REC FWD.

5-6) ID Recording and Reproduction

a) An ID number is recorded automatically when data recording is made. An arbitrary ID number cannot be recorded, however.

b) When REC PAUSE (REC FWD) is performed at the beginning of the tape (BOT), it runs automatically for about 5 seconds with the ID indicator flashing with BB.

c) When recording is performed after automatic recording at BOT ends, the ID number always begins with 01 and is incremented by one at every recording operation unless the tape is advanced over unrecorded tape during recording. (See Figure 1.)

d) If there is an unrecorded portion of tape during continuous recording, and the power is turned off, the ID number for the next recording is 01. (See Figure 2.)

e) Pressing the EVENT switch once during continuous recording increments the ID number by one and the number is recorded. This causes a start ID to be recorded for approximately 9 seconds, during which the decimal point of each digit in the ID number display flashes and the EVENT button cannot increment the ID number.
(To enable a normal search operation to be performed record for approximately 60 seconds or more for each ID.) (See Figure 1.)

f) The ID number can be used as a search number for finding the start of each recording portion as well as a recording number or file number. For the ID number to be used as a search number, the recording for that ID number must be approximately 60 seconds or more and there must not be any unrecorded portion on the tape. If the recording is short or discontinuous, the normal search may not be performed. (See Figure 1.)

g) When a recorded tape is used midway for recording, the unit reads and displays the ID number of the recorded portion.
Recording then starts from the portion with the ID number of [display value +1] after REC FWD is performed. (See Figure 2.)

h) When an attempt to continue an ID number by eliminating the unrecorded portion as shown in Figure 2, rewind the tape, stop it just before the end of the portion with ID number 12, and perform REC FWD.

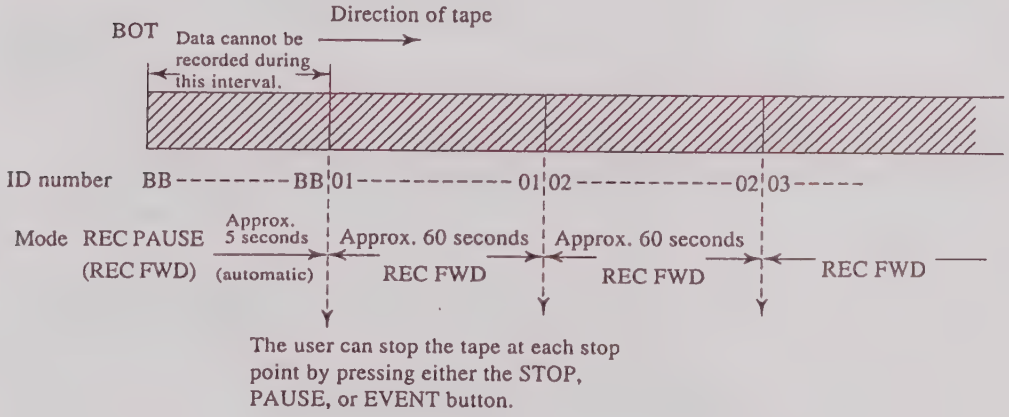


Fig. 1

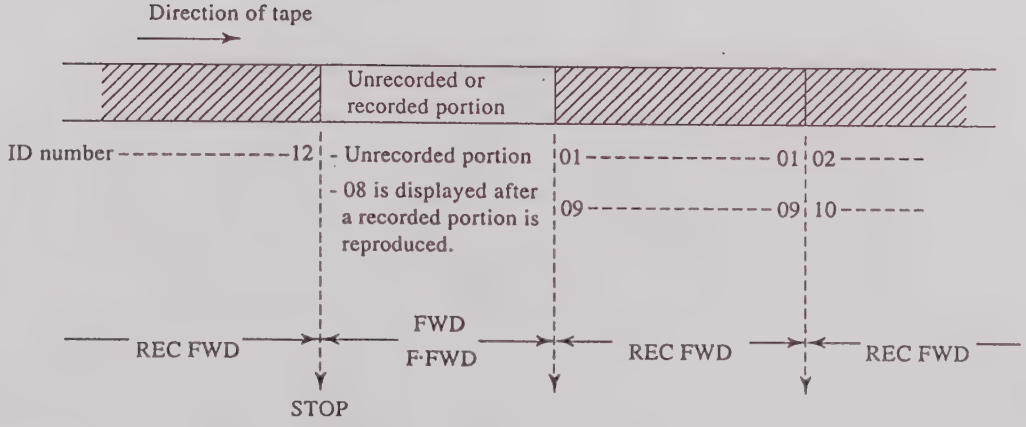


Fig. 2

5-7) Recording with the Counter

a) The counter value is displayed in minutes and seconds (M,S), and is recorded automatically when data recording is made. Arbitrary counter values cannot be recorded.

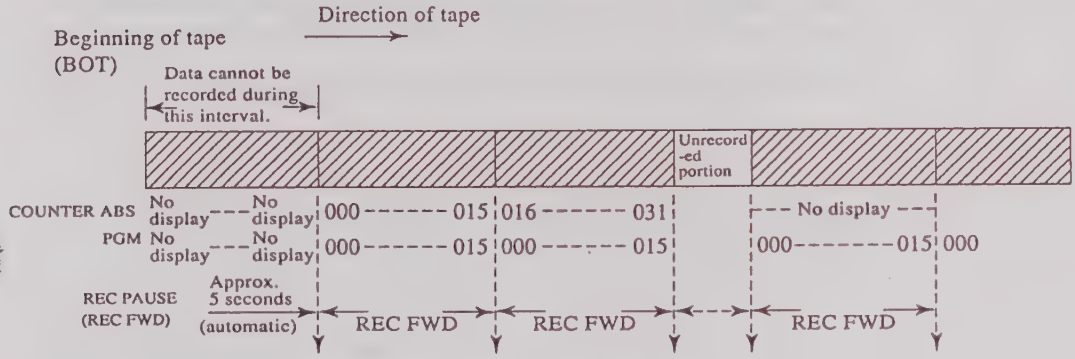
b) When REC PAUSE (REC FWD) is performed at BOT, the tape runs automatically for approximately 5 seconds without any display. (Figure 3)

c) The ABS mode or the PGM mode is used for displaying the counter.

d) A continuous counter value is recorded when continuous recording is made in the ABS mode. If unrecorded tape is used. The counter ABS value disappears after continuous recording stops. (Figure 3)

e) If a recorded tape is used to record data, this unit automatically reads the counter value of the previous recording and starts recording the counter value following that value when the cassette tape is loaded. (Figure 4)

f) The PGM mode value is recorded beginning with 00000 whenever a recording is made or the ID number is incremented by pressing the EVENT button.



The tape can be stopped at each stop point by pressing either the STOP or PAUSE buttons.

Fig. 3

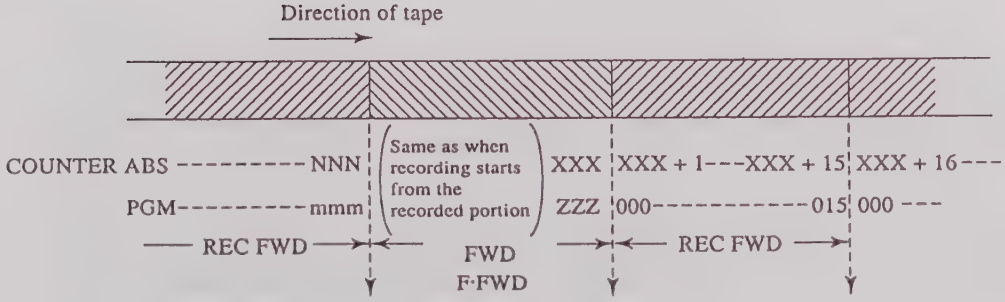


Fig. 4

5-8) CLOCK Recording

a) The clock value is recorded automatically when data is recorded.

b) Adjusting the year, month, and day

Press the MODE button to turn the CALENDAR LED on. Press the CLOCK SET button three or more seconds to put the recorder in the calendar adjustment mode. Enter the desired year, month, and day with the number buttons, then press the CLOCK SET button again to set the year, month, and day.

c) Adjusting the hours, minutes, and seconds

Press the MODE button to turn the REAL TIME LED on. Press the CLOCK SET button three or more seconds to put the recorder in the time adjustment mode. Enter the desired hours, minutes, and seconds with the number buttons, then press the CLOCK SET button again to set the hours, minutes, and seconds.

5-9) Search Operation

a) This unit can perform high-speed search with an ID number.

b) To enable the unit to perform normal search operation, as shown in Figure 1, continuous recording must have been made and one ID number must be recorded about 60 seconds or more.

c) When the desired ID number has been located, the unit automatically starts FWD reproduction.

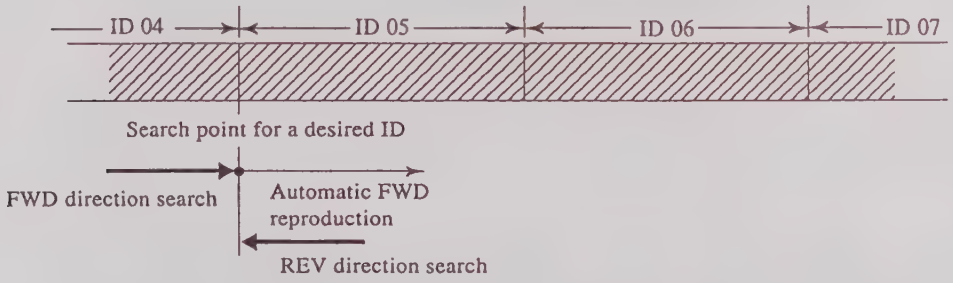


Fig. 5 Searching the tape for ID 05

Search method:

1) Enter the desired ID number (01 to 99) with the number buttons from 0 to 9 in the STOP mode. Press the FWD button, and the tape is automatically advanced to the entered number at a high speed. When the entered number is reached, the data recorder enters the FWD mode and the tape is reproduced.

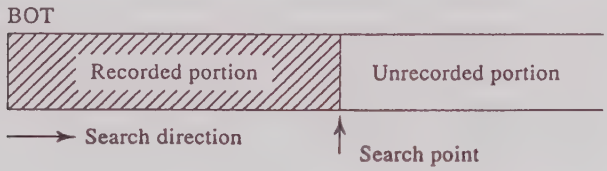
2) To perform a search during reproduction by pressing the FWD button, press the F·FWD button or the REW button while in the FWD mode. The unit searches the tape for the ID number of [display value + N] and enters the FWD reproduction mode when the F·FWD button is pressed N times.
The unit searches the tape for the ID number of [display value - (N - 1)] and enters the FWD reproduction mode when the REW button is pressed N times.

5-10) End Search (E SEARCH)

The E SEARCH button can be used to record data following a recorded portion on a tape.

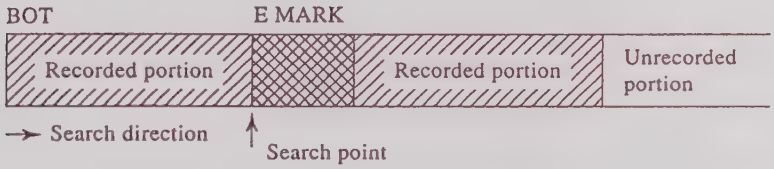
(1) When no E mark is recorded

Pressing the button searches for the end of the recorded portion from BOT, and the tape stops running.



(2) When the E mark is recorded

Pressing the button searches for the E mark from BOT and the tape stops running immediately before the E mark.



In either case shown above, when recording starts from the tape position after search operation, recording continues from BOT.

(3) Use of E marks

Use the E mark to indicate the end of new recording on a recorded tape. If more than one E mark is recorded on a tape, the tape is searched for first E mark from BOT. Record only one E mark on a tape.

5-11) Erasure

For the R-DAT cassette tape used in this unit, previous recordings are replaced by new recordings when a recording is made again on a recorded tape. Since previous recordings remain in the portions where rerecording is not made, data, memo, ID, COUNTER, and CLOCK are reproduced. When these data items interrupt data output or search operation, use the cassette tape whose entire contents are demagnetized by a bulk tape eraser. Because the R-DAT cassette tape is very difficult to erase, take enough time erasing both sides of the tape with the bulk tape eraser.
If there are portions left unerased, they may cause meaningless numbers to appear in the COUNTER, ID, and CLOCK displays and search or end search may operate abnormally.

6. MAINTENANCE

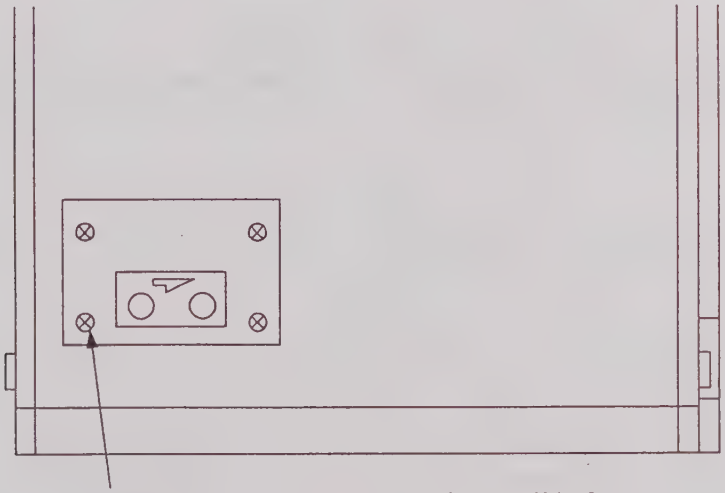
As a helical scanning rotary head is used in this unit, the maintenance for this unit is a little different from that of an analog recording data recorder. Read the following explanations and follow the maintenance procedures.

6-1) Cleaning the Head before Recording

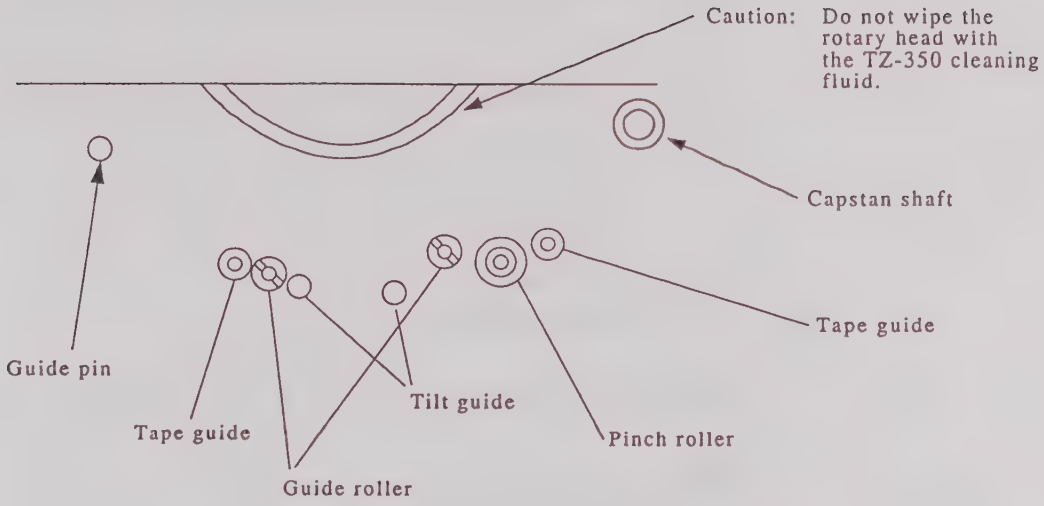
Before recording is performed (once a day) or if the MPX ERROR indicator lights despite correct operation during reproduction or if a waveform is missing, clean the rotary head by using the attached cleaning tape. As soon as loading the cleaning tape, run it for about 10 seconds by pressing the FWD button, then unload it. Do not run the cleaning tape for longer than 10 seconds; otherwise the tape will abrade the head. The attached TZ-350 cleaner kit is used to clean the guides, pinch roller, and so on. Do not wipe the rotary head with the cleaning fluid, otherwise dirt will adhere to the head and around it, causing problems like catching of the tape. Care must be taken.

6-2) Cleaning the Running System

If the running system is very dirty when viewed from the gap in the cassette compartment, clean the running system (except for the rotary head) as shown in the following figure once every 20 to 30 hours using the attached TZ-350 cleaner kit. Remove the four screws for fixing the cover of the cassette compartment with the Phillips screwdriver and wipe with a cotton swab.



Remove four setscrews attaching the lid of the cassette compartment, that is, 2 x 4 black bind screws.



Parts to be cleaned with the TZ-350 cleaning kit
(running-system parts which are visible when the cassette compartment is removed)

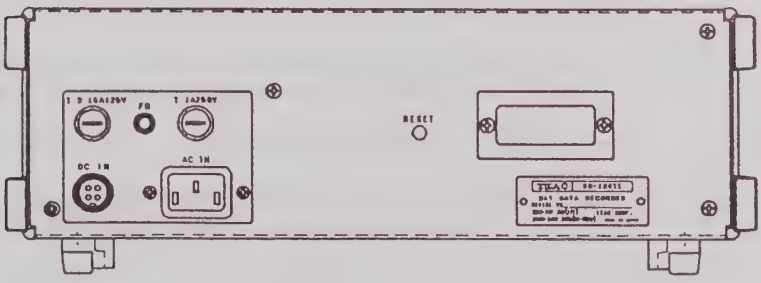
6-3) Action to Be Taken When the Tape is Caught by the Rotary Head

If the tape becomes tangled around the head due to condensation, immediately turn off the power and contact your nearest TEAC dealer. In case of emergency, take the following measure and contact a TEAC service agency.

1) Turn off the power and disconnect the power cable.

2) Remove the setscrews for the cassette compartment and slide the top cover backward.

Top cover

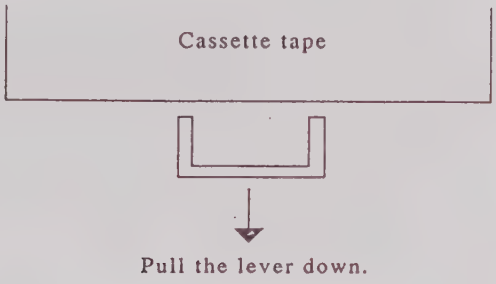


3) Loose the screws on the rotary head cover and remove it.

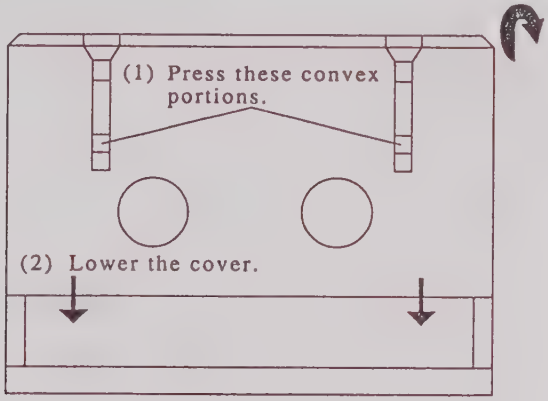
4) Manually turn the rotary head catching the tape about one turn clockwise.

5) Lead out the slack tape with tweezers or a ball-point pen when the caught tape becomes slack. Lead out more tape, turning the rotary head clockwise to untangle the tape.

6) Press down the lever in front of the cassette tape to open the cassette compartment.



7) Take out the cassette tape slowly and draw the tape into the cassette.



8) Check whether any foreign material has adhered to the drum where the tape was tangled by turning the rotary head slowly. Wipe off any foreign material with a cotton swab moistened with cleaning fluid of the TZ-350 cleaner kit. Do not wipe the rotary head, however.

9) After cleaning, slowly wipe the surface of the drum with a dry cotton swab. Care must be taken to prevent fragments of the cotton swab from adhering to the drum.

10) After the drum dries, turn on the power and allow 10 to 20 minutes for the unit to warm up.

11) Run the cleaning tape for about 10 seconds, then eject the cleaning tape, turn off the power, and install the top cover and the lid of the cassette compartment.

12) Check that the unit is functioning properly by recording and reproducing with a new cassette tape.

Note: Do not re-insert the damaged tape.
The tape may cause a problem because it is nearly worn out, a flow is made on it, or dust adheres to the rotary head.

7. CONFIGURATION

Tape transport:	1
TTP I/F PCBA:	1
Servo, recording or reproduction equalizer circuit, signal processing, error correction, control, etc.	
CONTROL (1) PCBA:	1
CONTROL (2) PCBA:	1
AD/DA PCBA:	1
Front panel assembly:	1
Power supply unit:	1
Chassis:	1

8. STANDARD ACCESSORIES

Magnetic tape:	1
BNC cable:	9 (RD-120TE) 17 (RD-130TE)
ac power cable:	1
dc power cable:	1
Microphone:	1
Earphone:	1
Cleaning tape:	1
Cleaner kit:	1
Fuse:	1 for each
Vinyl bag for accessory storage:	1
Instruction Manual:	1

9. OPTIONS

9-1) Rechargeable Battery Unit BU-41

Recording time:	Approx. two hours continuously (when fully charged)
Charging method:	The charge function is provided for in the power supply of this unit.
Protect function:	Overdischarge protective function (provided for in the power supply unit)
	Circuit breaker for protection against overcurrent
Installation method:	Installed with screws at the rear of the recorder.
Weight:	Approx. 2.6 kg (5.7 lbs)
Dimensions:	Approx. 240 (W) x 109 (H) x 75 (D) mm ($9^{7}/_{16}$ x $4^{5}/_{16}$ x $2^{15}/_{16}$ in.) (excluding protrusions)

9-2) Battery Charger BU-41CH

Available battery:	Dedicated to the BU-41 (BU-40 is also available)
Charging time:	Approx. three hours (Two units can be charged in parallel.)
Power requirements:	90 to 130 Vac
Dimensions:	Approx. 190 (W) x 90 (H) x 270 (D) mm ($7^{1}/_{2}$ x $3^{9}/_{16}$ x $10^{5}/_{8}$ in.) (excluding protrusions)

9-3) Remote Control Unit ER-40

Control:	REW, F-FWD, PAUSE, FWD, STOP, and REC push-button switches
Microphone:	A microphone input connector and LOCK feature of the microphone press talk switch are provided.
ID:	The EVENT switch is provided.
Power supply check:	A low voltage indicator is provided for when the unit is used with dc power.
Cable length:	Approx. 5 m
Weight:	Approx. 550 g (1.21 lbs)
Dimensions:	Approx. 165 (W) x 55 (H) x 64 (D) mm ($6^{1}/_{2}$ x $2^{3}/_{16}$ x $2^{1}/_{2}$ in.) (excluding protrusions)

9-4) Fixed Handle for Vehicle TZ-349

9-5) Rack-mount Adaptor TZ-348 RME/RMJ

10. SPECIFICATIONS

10-1) Major Specifications

Recording and reproduction method:	Analog input and output system by multiplexing PCM recording and reproduction
Tape used:	DAT standard tape Hitachi Maxell tapes are recommended DM120 tape length: 60 m tape width: 3.81 mm DM60 tape length: 30 m tape width: 3.81 mm
Recording format:	Conforms to the helical scanning R-DAT format.
Number of quantization bits:	16
Recording data length:	High-order 14 bits of quantization bits
Head	
Recording and reproduction:	4 heads: 2-head azimuth system (head for recording and reproduction) 2 heads for error checking during simultaneous recording and reproduction)
(Erasure) :	(Erasure method by overwriting)
Error correction method:	Double-encoded Reed-Solomon Code System
Tape speed:	8.15 mm/s (during recording or reproduction)
Head rotational speed:	2000 rpm (during recording and reproduction)
Recording time:	2 hours (during continuous recording with a 60-m tape (DM120)) 1 hour (during continuous recording with the 30-m tape (DM60))
Start or stop time:	Approx. 2 seconds
Fast-forward or rewind time:	Approx. 60 seconds (for a 60-m tape [DM120])

10-2) I/O Specifications

Input voltage:	±0.5 Vp, ±2 Vp, ±5 Vp, ±20 Vp max.
Input impedance:	100 kΩ unbalanced (nominal)
Input filters:	Both an analog filter and a 64-fold over-sampling digital filter are used.
Output voltage:	Fixed to ±2 Vp (load resistance 100 kΩ or more)
Output impedance:	75 Ω (nominal)
Output current:	±10 mA at 20 Ω load

Number of data channels and recording and reproduction frequency:

	RD-120TE	RD-130TE
Number of data channels	2 or 4 (changeover)	2, 4, or 8 (changeover)
Sampling rate	48 kHz/24 kHz	48 kHz/24 kHz/12 kHz
Recording and reproduction frequency	dc to 20 kHz/dc to 10 kHz	dc to 20 kHz/dc to 10 kHz/dc to 5 kHz

Frequency characteristic flat:	+0.5 dB, -1 dB
Output filter:	Both a octuple over-sampling digital filter and a low pass filter are used.
SN ratio:	72 dB
Phase difference between channels (Skew):	3° or less 0.42 µs (for 20 kHz) 0.84 µs (for 10 kHz) 1.7 µs (for 5 kHz)
Crosstalk:	Noise level or less
Linearity:	±0.1%
Distortion:	0.1%
Drift:	±0.1% or less (after 10 minutes of heat run)

10-3) Operating Conditions

Operating temperature:	0 to 40°C (32 to 104°F)
Relative humidity during operation:	20 to 80% (non-condensing)
Vibration:	Conforms to MIL-STD-810C TABLE 514.2-VI Ⓥ curve
Shock:	Conforms to MIL-STD-810C 30G-11 ms

10-4) Functional Specifications

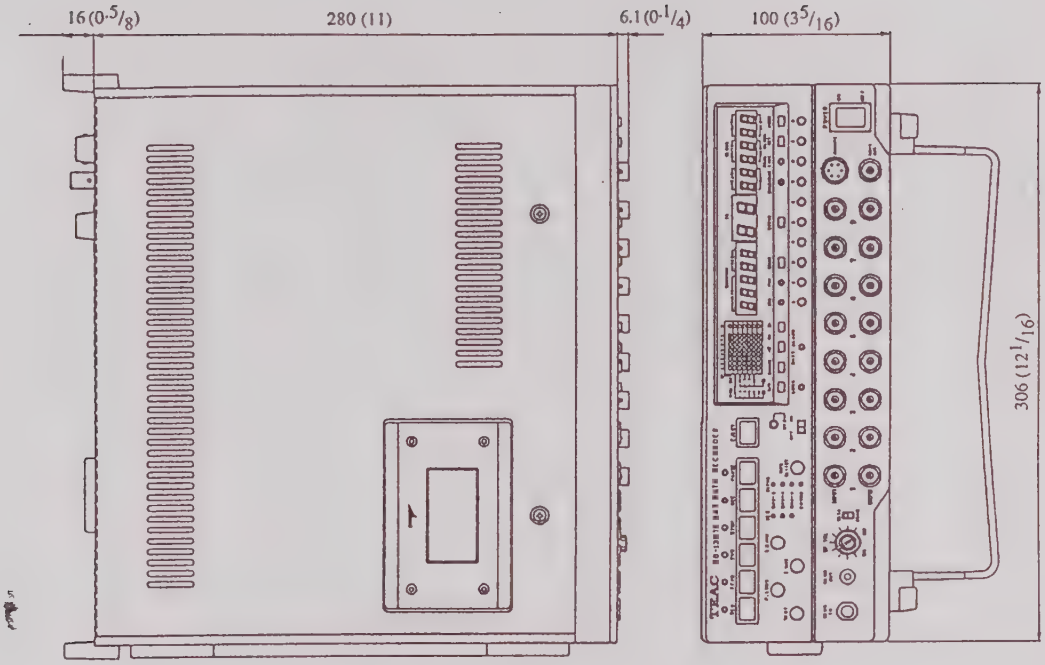
Memo sound:	Recording or reproduction band, 400 to 2600 Hz
(Automatic recording):	Recording with the built-in microphone (with the ON/OFF switch) or an external microphone
Clock:	Recording or reproduction of year, month, day, hour, minute, and second data
(Automatic recording):	Display changeover system of year, month, and day: (calendar) or hour, minute, and second: (real time)
ID (data number):	ID numbers 01 to 99 are recorded or reproduced and are displayed.
(Automatic recording):	ID number: Incremented by 1 every recording or whenever the EVENT switch is pressed during recording.
E (end) search:	E (end) mark or blank search
Search:	High-speed search of an ID number
Control:	F-FWD, REW, FWD, STOP, REC, PAUSE, and EJECT push-buttons
Monitor:	Bar meter (all data channels and a memo channel) Speaker/earphone (monitor select channel or memo channel) Monitor BNC connector (monitor select channel)
Test signal:	1 kHz and approx. 50% full-scale signal built-in

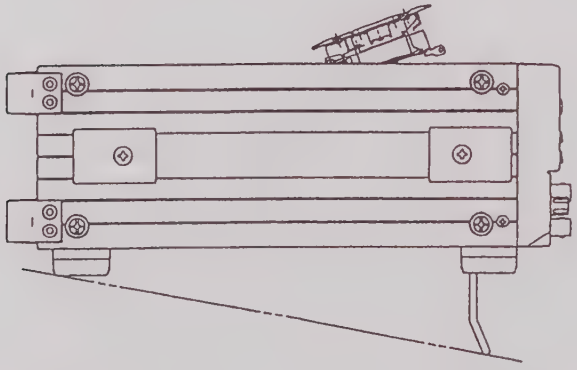
10-5) Others

Power system:	Switching regulator system
Supply voltage (for ac/dc):	Usable voltage and frequency (The values in parenthesis are rated values.) 90 to 264 (100 to 240) Vac 48 to 440 (50 to 60) Hz 11 to 30 (12 to 28) Vdc Automatic ac/dc changeover (ac precedes dc, however) The LOW BATT alarm function operates at approx. 11 Vdc or less. Output is cut off at approx. 10.2 Vdc or less. (Overdischarge protection function)
Current consumption:	Approx. 0.6 A with 100 Vac Approx. 2.0 A with 12 Vdc
Dimensions (W x H x D):	Approx. 306 x 100 x 280 mm ($12^{1}/_{16}$ x $3^{15}/_{16}$ x 11 in.) (excluding protrusions)
Weight:	Approx. 6 kg (13.2 lbs)

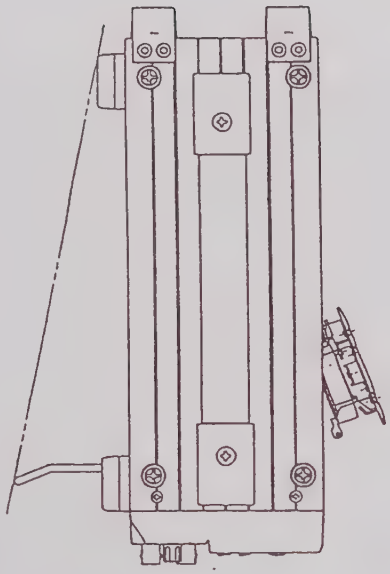
10-6) External View

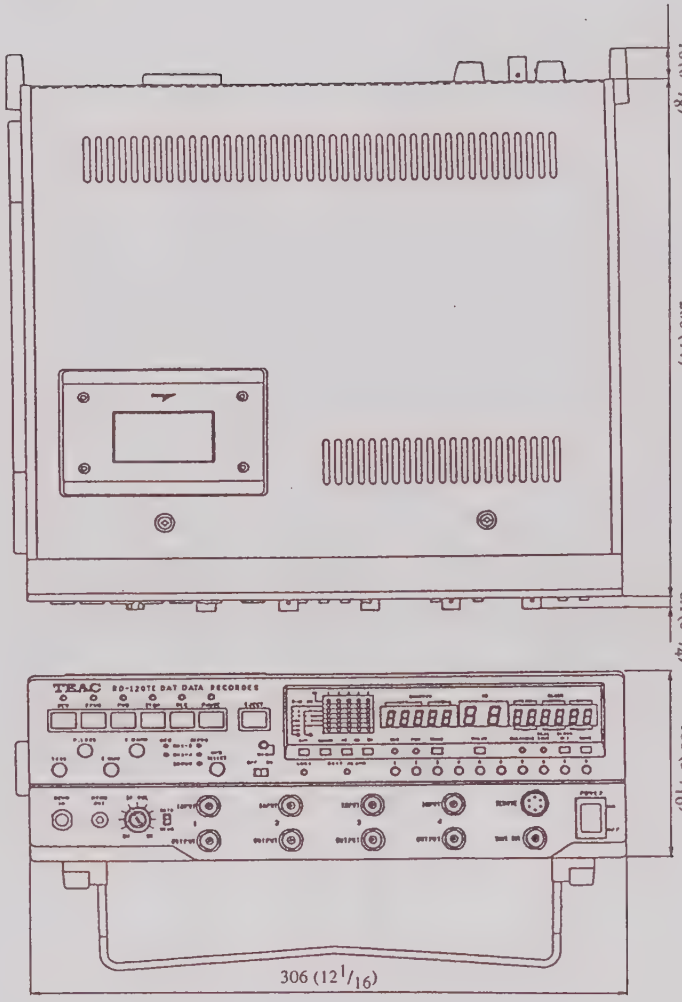
Dimensions (RD-130TE)





Unit: mm (inches)





Unit: mm (inches)

営業品目

- ❶デジタル磁気テープ記憶装置
- ❷フロッピーディスクドライブ
- ❸ハードディスクドライブ
- ❹データレコーダ
- ❺パーソナルコンピュータ
- ❻ビデオテープレコーダ
- ❼レーザービデオディスクレコーダ
- ❽各種センサ
- ❾直流増幅器

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